

REMARKS

This application has been reviewed in light of the Office Action of July 8, 2003. Claims 1-21 are pending, and all claims are rejected. In response, claims 1, 6, 12, 17, and 21 are amended, new claims 22-23 are added, and the following remarks are submitted. Reconsideration of this application, as amended, is requested.

Applicant thanks the Examiner for providing the relevant sections of the ASM Handbook.

Claims 1, 4-6, 8, 9, 12, 13, 16, and 17 are rejected under 35 U.S.C. § 103 as unpatentable over ASM Handbook volume 2 in view of ASM handbook volume 4. Applicant traverses this ground of rejection.

The explanation of the rejection (page 4, line 5) first refers to a “beta anneal” of Table 19, but later to a “beta quench” (page 5, line 1). Based upon the intervening discussion, Applicant believes that the explanation means to refer to the “beta quench” heat treatment of Table 19.

The following principle of law applies to all Section 103 rejections. MPEP 2143.03 provides, “To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).” [emphasis added] That is, to have any expectation of rejecting the claims over a single reference or a combination of references, each limitation must be taught somewhere in the applied prior art. If limitations are not found in any of the applied prior art, the rejection cannot stand. In this case, the single applied prior art reference clearly does not arguably teach some limitations of the claims.

Amended claims 1 and 12 recite in part:

“first heating the article to a first-heating temperature of greater than about 1600°F and in the alpha-plus-beta region of a phase diagram of the article”.

The beta quench heat treatment of Table 19 requires that the heat treatment be performed above the beta transus, and thence not in the alpha-plus-beta region of the phase diagram. The beta quench processing of Table 19 therefore cannot teach the method recited in amended claims 1 and 12. Claims 1, 4-5, 8, 9, 12, 13, 16, and 19 are therefore believed allowable over this ground of rejection.

Claims 6 and 17 are amended to independent form, without changing their scope. Each of these claims recites in part:

“wherein the step of processing includes the step of weld repairing the article at the first-heating temperature”

Applicant agrees that ASM teaches that weld repairing of castings is known. However, there is no teaching that weld repairing would be performed in conjunction with the beta quench heat treatment used for wrought titanium alloys. The relied-upon Volume 2, Section 4 identifies possible heat treatments performed in relation to the weld repair of castings--“stress relief annealed” and “postweld solution heat treatment”, and goes on to state “but standard practice is for stress relief or anneal only.” There is certainly no suggestion that weld repair of castings may be performed in conjunction with the wrought-alloy beta quench processing of Table 19. Table 19 comes from Volume 2, Section 2, “Wrought Alloy Processing”, while the discussion of welding at Volume 2, Section 4 comes under the topic “Titanium and Titanium Alloy Castings” and specifically describes weld repair of castings, not wrought product. Clearly, ASM teaches that the welded cast products have their own heat treatment different from the heat treatment for wrought products.

Placed into a legal context, MPEP 2143.01 provides that, in constructing a Section 103 rejection, the proposed modification cannot render the prior art unsatisfactory for its intended purpose or change the principle of operation of a reference. MPEP 2143.02 requires that, in combining the teachings, there must be a reasonable expectation of success in the combination. Both of these mandates would be violated in the proposed approach of using the beta quench heat treatment of wrought alloys in relation to the weld repaired cast alloys, since the heat treatment of cast alloys is specified to be quite different from the beta quench heat treatment sometimes used for wrought titanium alloys.

Claims 6 and 17 are therefore believed allowable over this ground of rejection.

New claim 23 is original claim 16 rewritten in independent form and without the limitation that the first heat treatment be in the alpha-plus-beta range. The combination of references cannot teach the limitations of this claim 23, because of the reasons discussed above and incorporated here.

Claims 2, 3, 14, and 15 are rejected under 35 U.S.C. § 103 over ASM Handbook volume 2 in view of ASM handbook volume 4, and further in view of Ruckle U.S. Patent 4,631,092. Applicant traverses this ground of rejection.

Claims 2, 3, 14, and 15 incorporate the limitations of their respective parent claims 1 and 12, which are not taught by the combination of the two ASM handbook references for the reasons stated earlier and which are incorporated here. Ruckle '092 adds nothing in this regard, and in fact also requires a heat treatment above the beta-transus temperature.

New claim 22 is original claim 14 rewritten in independent form and without the limitation that the first heat treatment be in the alpha-plus-beta range. The combination of references cannot teach the limitations of this claim 22, because Ruckle requires a specific heat treatment for thick/thin parts such as a fan blade (not a compressor blade) in which the

third step, following a rapid quench from the heat treatment at or above the beta transus temperature, is a heat treatment at 1500-1825°F (col. 5, lines 7-10, see also claim 1 of Ruckle). This heat treatment is inconsistent with the lower-temperature tempering step of the beta quench processing of Table 19, and therefore the two teachings cannot be combined.

Claim 22 recites in part:

“second heating the article to a second-heating temperature of from about 1275°F to about 1375°F”.

Ruckle requires a much higher final heat treatment step than recited in claim 22 and taught in the beta quench of Table 19. As noted above, it is impermissible to combine the teachings of two references so as to render one or both inoperable or without expectation of success, and that is the result of combining the teachings of the two ASM references and Ruckle. Claim 22 is therefore believed to be allowable over this ground of rejection.

Claims 7, 10, 11, 18, 20, and 21 are rejected under 35 U.S.C. over ASM Handbook volume 2 in view of ASM handbook volume 4, and further in view of Whang U.S. Patent 4,512,826. Applicant traverses this ground of rejection.

Claims 7, 10, 11, 18, 20, and 21 incorporate the limitations of their respective parent claims 1 and 12, which are not taught by the combination of the two ASM handbook references for the reasons stated earlier and which are incorporated here. Whang ‘826 adds nothing in this regard.

Whang ‘826 teaches a precipitation hardening treatment for titanium alloys (col. 4, lines 1-17) containing small amounts of rare earth additions. There is no teaching of the alloy composition recited in present claim 1. Applicant can find no mention or teaching of heat treating alpha-beta titanium alloys, as recited in claim 12. The only alloy types

specifically mentioned in conjunction with Whang's heat treatment appear to be alpha-titanium alloys (col. 4, lines 1-17, claim 2), not alpha-beta titanium alloys.

Claims 7 and 18 recite in part: "second heating to the second-heating temperature of about 1350°F for a time of from about 4 to about 6 hours".

Claims 10 and 20 recite in part: "the step of second heating includes a time of from about 4 to about 6 hours at the second-heating temperature", where the second-heating temperature is "from about 1275°F to about 1375°F" (from the respective parent claims).

Whang '826 teaches (col. 4, lines 22-23) an age-hardening heat treatment "from 2-10 hours for 500°C", which is 932°F. This teaching is not pertinent to the limitations of claims 7, 10, 18, and 20 for several reasons. First, as noted above, Whang appears to deal with alpha-titanium alloys, not alpha-beta-titanium alloys. Second, the age-hardened microstructure, shown in several micrographs of Whang, is not a martensitic structure as recited in the present claims. Third, 932°F is far below the temperatures recited in the present claims. Whang teaches elsewhere (col. 4, line 21) that the age-hardening heat treatment may be in the range of 500°C to 700°C (932°F to 1292°F). There is an overlap of the lower end of the temperature range of claims 10 and 20 with the 932°F to 1292°F range of Whang, but Applicant cannot find that Whang has any teaching of the aging times to be used for the upper end of the range. Coupled with the fact that Whang's teachings deal with an entirely different alloy family (alpha-titanium alloys) than the present claims (alpha-beta titanium alloys) and the entirely different microstructure, Whang does not teach the limitations of claims 7, 10, 18, and 20.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

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Applicant submits that the application is now in condition for allowance, and requests such allowance. The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to Deposit Account No. 50-1059.

Respectfully submitted,
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